PATENT ABSTRACTS OF JAPAN

(11)Publication number : 06-053711

(43)Date of publication of application : 25.02.1994

(51)Int.Cl. H01P 3/00
H01P 3/08
H01P 3/10
H01P 3/16

(21)Application number : 04-220881

(22)Date of filing : 28.07.1992

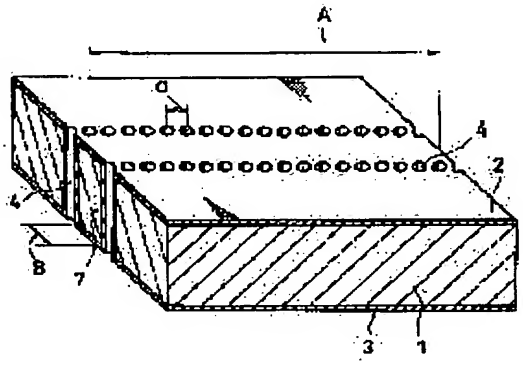
(71)Applicant : FUKUSHIMA NIPPON DENKI KK

(72)Inventor : FURUYAMA SHIGEKI

(54) WAVEGUIDE LINE

(57)Abstract:

PURPOSE: To facilitate the processing and to improve the productivity by providing two lines of throughholes used to connect conductor layers, selecting an interval of the throughholes of each line smaller than an interval equivalent to a cut-off wavelength and selecting the interval of the two lines for the through holes to be a prescribed width of the waveguide.



CONSTITUTION: Two lines of plural throughholes 4, 4,... are provided for a dielectric base 1 including conductor layers 2, 3. An interval (a) of the throughholes of each line is selected to be an interval smaller than a cut-off wavelength of a relevant electromagnetic wave. Furthermore, an interval B of the lines of the throughholes 4 is selected in relation to a frequency of an electromagnetic wave. Thus, upper lower layers 2, 3 are connected by the lines of the throughholes 4 arranged at the smaller interval than the cut-off wavelength and a wall face of a square waveguide part 7 is formed approximately to form the waveguide line. In the Figure, a caption A indicates part of the waveguide line in the lengthwise direction. Thus, the electromagnetic having a prescribed frequency is surely propagated in a prescribed direction while being guided through the throughholes 4,4,... formed in the two lines in the base 1.

LEGAL STATUS

[Date of request for examination]	28.06.1996
[Date of sending the examiner's decision of rejection]	17.11.1998
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]	
[Date of final disposal for application]	
[Patent number]	
[Date of registration]	
[Number of appeal against examiner's decision of rejection]	

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] The waveguide track characterized by setting spacing of the train of the flow hole of these two trains as predetermined waveguide width of face while making spacing of 2 ****** and the flow hole of each of this train into spacing smaller than cutoff wave length for the flow hole which consists of the plurality which connects said conductor layer to the dielectric substrate which has a conductor layer more than a bilayer.
[Claim 2] The waveguide track characterized by having set spacing of the train of the through hole of these two trains as predetermined waveguide width of face, and filling up said each through tube with a conductive member while making spacing of 2 ****** and the through tube of each of this train into spacing smaller than cutoff wave length for the through tube which consists of the plurality which connects said conductor layer to the dielectric substrate which has a conductor layer more than a bilayer.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the waveguide track for a microwave band or millimeter wave bands which starts a waveguide track, especially is constituted in a dielectric substrate.
[0002]
[Description of the Prior Art] About the propagation circuit which sends an electromagnetic wave along with a substrate, some attempts, such as the strip line and a surface waveguide, are made and put in practical use conventionally.
[0003]
[Problem(s) to be Solved by the Invention] However, if it was in this conventional example, neither was necessarily enough about the unification with a substrate, after forming the propagation circuit for electromagnetic waves independently for this reason, there was troublesomeness of connecting with a predetermined substrate anew, and there was un-arranging [that productivity was bad].
[0004]
[Objects of the Invention] This invention sets it as the purpose to offer the waveguide track which planned the productivity drive while it improves un-arranging [which this conventional example has] and attains the unification with a dielectric substrate especially.
[0005]
[Means for Solving the Problem] While making spacing of 2 ****** and the flow hole of each of this train into spacing smaller than cutoff wave length for the flow hole which consists of the plurality which connects said conductor layer with this invention to the dielectric substrate which has a conductor layer more than a bilayer, the configuration of setting spacing of the train of the flow hole of these two trains as predetermined waveguide width of face is taken. It is going to attain the purpose mentioned above by this.
[0006]
[Function] The electromagnetic wave of predetermined frequency is guided in the flow hole formed over two trains, and the inside of a dielectric substrate is certainly spread in the predetermined direction.
[0007]
[Example] Hereafter, one example of this invention is explained based on drawing 1 . In this drawing 1 , a sign 1 shows a dielectric substrate. Both sides of this dielectric substrate 1 are respectively equipped with conductor layers 2 and 3 in the shape of a field all over the. The flow holes 4 and 4 and .... which pierce through the conductor layers 2 and 3 concerned and the dielectric substrate 1 to said dielectric substrate 1 containing conductor layers 2 and 3, and change from plurality to it are prepared over two trains. Processing formation of the flow hole 4 of each of this train is carried out with the gestalt which flows through between the conductor layers 2 and 3 mentioned above. The spacing a of the flow hole 4 of each of this train is set as spacing smaller than the wavelength (cutoff wave length) of the electromagnetic wave concerned. Furthermore, the spacing B of the train which consists of a flow hole 4 of these plurality is specified with the frequency of an electromagnetic wave.
[0008] Thus, flow connection of the vertical conductor layers 2 and 3 is carried out by the train of the flow hole 4 put in order at small spacing, the wall surface of the rectangular waveguide part 7 is formed in approximation by this of it, and the waveguide track is constituted from cutoff wave length. Notation A shows a part of die-length direction of a waveguide track. Thereby, the electromagnetic wave of predetermined frequency is guided at the flow holes 4 and 4 and .... which were formed over two trains, and the inside of the dielectric substrate 1 is certainly spread in the predetermined direction.
[0009] A through tube is formed first and you may make it fill up each through tube with a conductive

member after that about the flow hole 4 here.
[0010] Thus, since a waveguide track can be formed free towards the part of the arbitration in the dielectric substrate 1 according to this example, processing becomes easy. The need of newly equipping with other members on a substrate since a waveguide track can be set up by carrying out predetermined hole processing to the dielectric substrate 1 is completely lost. The outstanding waveguide track which a configuration becomes very easy in this point, and is not in the former that the miniaturization of the whole equipment can also be attained can be acquired.
[0011]
[Effect of the Invention] Since this invention is constituted as mentioned above and functions, and a waveguide can be set up free towards the part of the arbitration in a dielectric substrate according to this, processing becomes easy. The need of newly equipping with other members on a substrate since a waveguide track can be set up only by carrying out two or more predetermined hole processings to a dielectric substrate is completely lost. The outstanding waveguide track which a configuration becomes very easy in this point, and is not in the former that the miniaturization of the whole equipment can also be attained as compared with the conventional thing can be offered.

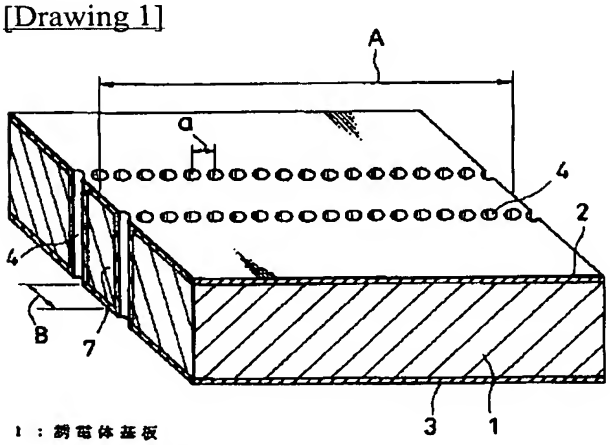
[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]



1：誘電体基板
2，8：導体層
4：導通穴
7：導波管部分
A：導波管線路長さ方向の一部
a：導通穴間隔
B：列の間隔

[Translation done.]